

DESCRIPTIONS OF SOME NEW ARANEIDÆ OF NEW  
SOUTH WALES. No. 5.

By W. J. RAINBOW.

(Plates XXII.-XXIII.)

Family EPEIRIDÆ.

Genus NEPHILA, Leach.

NEPHILA FLETCHERI, sp. nov.

(Plate XXII. figs. 1, 1a.)

♀. Cephalothorax, 8 mm. long, 5 mm. broad; abdomen, 12 mm. long, 6 mm. broad.

*Cephalothorax* dark mahogany-brown, thickly clothed with hoary hairs; *caput* elevated, rounded on sides and upper part, deeply compressed at junction of cephalic and thoracic segments, forming deep, sublateral indentations; these latter only thinly furnished with short, hoary hairs; at posterior extremity of cephalic segment there are two coniform tubercles of dark mahogany colour. *Clypeus* broad, moderately convex, clothed with hoary pubescence, indented laterally; a deep, broad, transverse groove at centre; indentations and grooves sparingly pubescent. *Marginal band* narrow, fringed with hoary hairs.

*Eyes* of an opaline tint, placed on dark rings; the four central eyes are seated on a moderately convex eminence, and form an almost quadrangular figure; of these the front pair are somewhat the smallest, and are separated from each other by about twice their individual diameter; the posterior pair are also divided by a distance equal to twice their individual diameter; the lateral pairs are much the smallest, and are placed obliquely on small tubercles, but are not contiguous.

*Legs* long, slender, yellow-brown; *trochanters* sparingly pubescent, few short spines; *femora* thickly clothed with long yellow hairs, and armed with rather short spines; *tibial joints* armed with short spines and bristles; *metatarsi* and *tarsi* dark brown, thickly clothed with short dark brown bristles; *superior tarsal claws* moderately long, curved and pectinated; *inferior claw* sharply curved. Relative lengths of legs 1, 2, 4, 3; of these the third pair are much the shortest.

*Falces* dark brown, approaching bistre, somewhat conical, divergent at apex; the margins of the furrows of each falx are armed with a row of five teeth.

*Maxillæ* yellow-brown, outer margins bistre, rather longer than broad, divergent; few coarse dark hairs.

*Labium* yellow-brown, longer than broad, about half the length of maxillæ; furnished with a few short dark hairs.

*Sternum* yellow-brown, shield-shaped, outline sinuous; surface uneven, sparingly clothed with white pubescence.

*Abdomen* ovate, moderately convex, projecting over base of cephalothorax; superior surface sparingly pubescent, yellow-brown, somewhat darker towards posterior extremity; ornamented with 17 spots, and, from near centre to posterior extremity, five indistinct parallel, though somewhat uneven, lines; of the former there are six conspicuous spots and 11 minute ones; the larger ones are distributed in three pairs, the first of which is seated well forward; between the individuals comprising the first pair there is a minute spot; below the first pair there are six minute spots, arranged in two rows, the first of which contains four individuals, and is slightly curved; the second pair are placed near the centre, and each spot of the first and second pairs are relieved by an almost circular yellow patch or disc, rather more than its own diameter; the third pair are seated lower down, but are not nearly so dark as those of the first and second pairs, nor are they relieved in like manner; towards the posterior extremity there are two smaller and less distinct pairs; the parallel lines or markings commence at a point above second pair of spots, and run midway between

them; at their commencement the design represents a bifurcated figure, the two outer lines forming a junction just between the spots referred to, from whence they suddenly open out; the centre line commences below junction of outer lines, and terminates at a point rather lower down at posterior extremity than its neighbours, the two other lines start at a point about midway between second and third pairs of spots, from whence they open out, and intersect the outer and centre lines; in addition to the lines described, there are also faint oblique and transverse uneven markings both above and below third pair of distinct spots; sides yellowish, mottled with brown, dark brown patches in places; ventral surface dark brown, interspersed with yellow; a broad transverse yellow band, uneven in outline, extends immediately below branchial opercula, the band is curved posteriorly; above the region of spinnerets there is a second, transverse, yellow band, but this is much narrower and more even in outline than the former; this band is much more curved than the former, the curvature being directed forward; there are also two yellow patches closely contiguous to base of spinners.

*Hab.*—New England District, N.S.W.

I have very much pleasure in associating this specimen with the name of my esteemed contemporary, J. J. Fletcher, Esq., M.A., B.Sc., to whom I am indebted, not only for the one herein described, but also for other interesting specimens, as well as much valuable assistance in other directions.

NEPHILA EDWARDSII, sp.nov.

(Plate XXII. figs. 2, 2a.)

♀. Cephalothorax, 8 mm. long, 5 mm. broad; abdomen, 14 mm. long, 7 mm. broad.

*Cephalothorax* and *eyes* similar to *N. Fletcheri*.

*Legs* long, slender, brown with yellow annulations at joints; *trochanters* moderately hairy, few short spines; *femora* thickly clothed with rather long dark hairs and spines; *tibial joints*, yellow annulations at commencement, below dark brown, approaching sepia, thickly furnished with long dark hairs or bristles and

spines; *metatarsi* and *tarsi* dark brown approaching sepia, thickly clothed with dark bristles; *superior tarsal claws* moderately long, curved and pectinated; *inferior claw* sharply curved. Relative lengths 1, 2, 4, 3; of these the first pair are the longest, the second and fourth pairs coequal; third pair much the shortest.

*Palpi* moderately long, similar in colour and armature; terminal claw slightly curved, and armed with four teeth near the base on the underside.

*Falces* dark brown, vertical, somewhat conical, divergent at apex; the margins of the furrows of each falx armed with a row of five teeth.

*Maxillæ* dark brown, approaching bistre, rather longer than broad, divergent, fringed with rather long black hairs.

*Labium* dark brown, longer than broad, about the length of maxillæ.

*Sternum* shield-shaped, sparingly hairy, tubercular, yellow-brown; dark brown patch at centre.

*Abdomen* ovate; moderately convex, projecting over base of cephalothorax; superior surface pubescent, light brown, ornamented by a large number of symmetrically disposed punctures, six of the largest of which are situated tolerably well forward, forming a somewhat triangular figure; immediately above these there are 12 smaller punctures forming an arch, and immediately underneath seven minute ones arranged in the following order:—1, 2, 1, 2, 1; in addition to these there are 11 other punctures as large as those comprising the triangular figure, disposed in three rows, each slightly curved, the curvature being directed forward; of these the first row, which is situated near the centre, contains three, and the second and third four each; besides the punctures herein described the posterior portion of the abdomen is further ornamented by four tolerably distinct longitudinal parallel lines or markings; each lateral line commences at the centre of the lateral punctures of the first row of three, and running to the tip of the abdomen intersects each lateral puncture of the second and third rows; the inner lines commence as a single one at a point

above the centre puncture of the first row, intersecting it, and continue as such until near the two inner punctures of the second row, where it opens out and forms two lines; from thence they proceed to the extremity of the abdomen, intersecting each puncture; laterally the colour, towards the dorsal surface, is a shade darker, but lower down a rich nut-brown colour prevails; the sides are ornamented with yellowish wavy markings; ventral surface dark brown, with yellowish lateral and transverse markings. *Epigyne* a transverse, oval, dark brown eminence, concave within.

*Hab.*—Sydney.

The specimen described above was obtained by Dr. C. A. Edwards, M.D., M.R.C.S., Edin., of Waverley, and it affords me great pleasure in connecting his name with it. To the same gentleman I am indebted for many other interesting specimens and much valuable information as the result of personal and independent observation.

NEPHILA VENTRICOSA, ♂. *et* ♀., sp.nov.

(Plate XXIII. figs. 1, 1*a*, 2, 2*a*.)

♂. Cephalothorax, 2 mm. long, 1.5 mm. broad; abdomen, 2 mm. long, 1.5 mm. broad.

*Cephalothorax* convex. *Caput* yellow, furnished with few short yellowish hairs, normal grooves and indentations indistinct. *Clypeus* dark brown.

*Eyes* prominent, glossy black, the four centrals form a somewhat quadrangular figure; lateral pairs much the smallest, placed obliquely on minute tubercles; not contiguous.

*Legs* long, slender, tapering to a point, yellowish, furnished with rather long hairs and spines; *superior tarsal claws* long, curved and pectinated; *inferior claw* sharply curved. Relative lengths 1, 2, 4, 3; the second and fourth pairs are coequal, or nearly so, while the third pair is by far the shortest.

*Palpi*: humeral joint slender, yellow, few black hairs and slender bristles; nearly twice as long as cubital and radial joints

together; of these two latter, the radial is rather the longer, and each is similar in colour to humeral joint; two large bristles project from radial joint, the shorter directed outwards, and curving slightly backward, the longer and stronger one curved and directed forward; digital joint twice as long as the three former, dark brown, hairy; palpal organs simple, bulb large, hairy on upper-side, glossy underneath, terminated by a long flagellum; bulb hairy, concave on inner side; curving over bulb from basal end is a long, stout, dark process.

*Falces* yellowish, long, vertical, divergent at apex.

*Maxillæ* yellowish, outer margins dark, longer than broad, divergent, few coarse dark hairs.

*Labium* yellow, longer than broad, rather more than half the length of maxillæ.

*Sternum* yellow, shield-shaped, furnished with few rather long coarse hairs.

*Abdomen* ovate, moderately convex, hairy, projecting over base of cephalothorax, dark brown, mottled with yellow.

*Hab.*—Sydney.

♀. Cephalothorax, 9 mm. long, 7 mm. broad; abdomen, 22 mm. long, 13 mm. broad.

*Cephalothorax* black, clothed with hoary hairs. *Caput* elevated, rounded on sides and upper part, truncated in front, sides furnished with hoary hairs, apex glossy black; at junction of cephalic and thoracic segments there are two coniform tubercles. *Clypeus* broad, moderately convex, thickly clothed with hoary hairs; there are central and lateral depressions, the former sensibly the deepest; depressions black and devoid of hairs. *Marginal band* rather broad, clothed and fringed with hoary hairs.

*Eyes* with pearl-grey lustre; distributed as in *N. Fletcheri* and *N. Edwardsii*.

*Legs* long, yellow, annulated with dark brown, furnished with rather long hairs and short spines; the former are longest at the sections where the annulations occur; the *tibial joints*, *metatarsi*,

and *tarsi* dark brown, approaching sepia; *tarsal claws* as in *N. Fletcheri* and *N. Edwardsii*. Relative lengths 1, 2, 4, 3.

*Palpi* moderately long; humeral and cubital joints yellowish, the others dark brown, approaching sepia; similar in armature to legs.

*Falces* black, glossy, vertical, divergent at apex; armed with a row of five teeth along each margin of the furrow of the falx wherein the fang lies concealed when at rest.

*Maxille* sepia, inner margins yellowish, longer than broad, divergent; a few coarse dark hairs on outer margins.

*Labium* dark, glossy, yellowish patch in centre, about half the length of maxillæ; furnished with few rather long dark hairs.

*Sternum* orange-yellow, dark irregular transverse band at middle, shield-shaped, tuberculate.

*Abdomen* ovate, exceedingly convex, projecting over base of cephalothorax, pale yellow, somewhat darker at posterior extremity, clothed with minute hairs; dorsal surface ornamented with a curved row of 10 minute dark spots towards anterior extremity; seated lower down are two other dark spots, much larger than those of the curved series, and each is relieved by a circular pale yellow patch or disc at the upper margin, in a somewhat lateral position; from the lower lateral margin of each spot there extends in an outward oblique direction a short slightly curved line, terminating with a minute spot; immediately between the curved lines there is a short straight longitudinal line; at the centre of dorsal surface there are other two dark spots, more widely removed than former pair, and each is also relieved by a circular pale yellow patch or disc; midway between these two latter spots, and connecting them, is a series of longitudinal parallel and curved markings, which proceed therefrom and terminate at posterior extremity (*vide* fig. 2, Pl. XXIII.); near posterior extremity, and inside lateral longitudinal lines, there are two small yellow discs separated from each other by two parallel lines; laterally the abdomen is much darker, and is ornamented with four broad white irregular bands; ventral surface dark brown,



ornamented about midway between branchial opercula and spinnerets with a yellowish transverse, slightly curved band, the lateral extremities of which are somewhat abruptly directed towards posterior extremity. *Epigyne* a dark brown, glossy, transverse oval eminence, concave within.

*Hab.*—Sydney.

The spiders of the genus *Nephila* are undoubtedly one of the most interesting groups of Australian orb-weavers, both as regards their size, beauty and webs. Representatives of the genus abound in tropical and sub-tropical regions, often occurring in communities, and constructing their webs closely together, occasionally within reach, but not infrequently from 10 to 20 feet from the ground, and always in a position exposed to the rays of the sun. The snares are bright yellow, and so remarkably viscid as to follow the point of a needle; they vary in diameter from three feet upwards, while the supporting lines or guys sometimes measure from 10 to 12 feet.\*

So strong are these snares that small birds are occasionally entrapped by them. The writer on one occasion saw a young bird that had been newly caught in the web of a *Nephila* in the vicinity of Sydney. It was in vain the unhappy bird struggled to free itself from the toils; the more it fought, the more hopeless became its position, while the damage inflicted upon the web was considerable. And the spider itself was evidently afraid of the victim. It had taken its position in the usual spot—the centre—its huge legs spread out, covering a space of four or five inches. Occasionally it ran from the centre towards the struggling bird, but speedily retraced its steps. All this time the spider was throwing threads around the body of the victim, and rapidly enveloping its head and wings. As a result the struggles became less desperate, until at length they ceased, death resulting apparently from exhaustion. Bushmen have assured the writer

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\* According to Gräffe, a large species of *Epeira* occurs in the Fiji Islands, which constructs a strong web often 30 feet or more in diameter. Verh. Zool. Bot. Ges. in Wien, xvi. p. 500. [Doubtless one of the *Nephila*.—W.J.R.]



that, riding through the bush in the autumn, they have seen skeletons of small birds hanging in the webs of "triantelopes," as they are pleased to call them. Mr. J. A. Thorpe, of the Australian Museum, Sydney, has informed the author that at Madden's, near Belle Plains, he has met with specimens of the emu wren (*Stipiturus malachurus*) entangled in the sticky meshes of the webs of spiders of the genus *Nephila*; also at Cape York, he had seen several of the blue-warblers, notably *Malurus amabilis*, Gould, and *M. Brownii*, Vig. et Horsfield, that had fallen victims in a like manner. It must be noted, however, that it is only young birds or those of a weak wing-power that are so captured. An Indian writer states that in many unfrequented dark nooks of the jungle the traveller comes across most perfect skeletons of small birds caught in the powerful snares of the *Nephilæ*, the strong folds of which prevent the delicate bones from falling to the ground after the wind and weather, together with other agencies, have dispersed the flesh and feathers. Further, a naturalist, writing under the *nom-de-plume* "H. A. H.," from Cashar, to the *Asian*, stated that he had "received from a neighbouring planter an adult female of the three-toed Kingfisher which was found entangled in a spider's web. Although true Kingfishers, these lovely birds feed largely on insects. Curiously enough," continued the writer, "the stomach of the last bird I preserved contained a large brown spider. Doubtless the bird went either for the spider or some insect caught in the web, and got entangled in the sticky meshes."

Some writers on this subject have supposed, and even boldly asserted, that birds so caught were devoured by the spiders in whose webs they had become entrapped, but this conclusion is in my opinion erroneous. In 1834 the late W. S. Macleay, F.Z.S., in a paper\* communicated to the Zoological Society, London, wrote:—"Now, it is certainly possible that the net of *Nephila* should, in accord with Labat's account, accidentally arrest such small birds as are several species of *Trochilide*; but I do not

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\* Trans. Zool. Soc. 1834, pp. 192-3.



believe that a spider would touch them. My garden, I repeat, is full of these *Nephilæ* in autumn, and I tried to regale one of them with a small species of *Sphærio dactylus* by putting it into her net. The spider on feeling the threads vibrate with the struggles of the lizard instantly approached and enveloped it in her web. As soon, however, as it was thus disabled, my *Nephila* seemed to become aware of her mistake, and losing no time in cutting the lines, allowed her prisoner to fall to the ground." This conclusion, however, Mr. Macleay felt called upon six years later to withdraw, for in a letter to W. E. Shuckard, Esq.,\* dated Sydney, 7th April, 1840, he stated that:—"In the vicinity of Sydney he had met with a true bird-catching spider, he having himself found one of the *Epeiridæ* actually devouring one of the young of the *Zosterops* that had recently flown from the nest; and which is not a solitary instance, as his father, A. Macleay, Esq., had previously observed a similar fact."

It is abundantly clear from the foregoing that the snares of certain spiders arrest the young of certain birds, as also those of a weak wing-power, but the author is decidedly of opinion that the spiders in question do not obtain or receive nourishment from their ornithological victims. The webs are not set with the object of catching any such game. Each snare is placed in its position by the unerring instinct of the spider, simply because the situation is such as will assure abundance of food in the shape of insects, and it is merely an accident when a bird becomes ensnared in the toils.

I do not deny that a *Nephila* has been observed with its fangs plunged in the body of an ensnared bird, but that is not evidence *ipso facto* that it was making a meal. It is more than likely, indeed, that it attacks the bird, when it can safely do so, for the purpose of injecting its poison, thus hastening death, and preventing the victim from too seriously injuring its web. Moreover, it must be noted that when any insect becomes entangled in the web of a *Nephila* the spider rushes upon the intruder, and plunging

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\* Lardner's "Cabinet Cyclopædia," p. 382.

her fangs therein, maintains her grasp until death ensues; thereupon she envelopes the body in her thread and bears it to a quiet spot, where she can devour in peace her spoil. This scene could hardly be enacted by the largest *Nephila* on the smallest bird known. Such, however, is my belief, and I feel certain that any who will observe for themselves, and closely watch the subject, will ultimately bear out my view of the case. It is, unhappily, too often a fact that observers are in many instances prone to hasty conclusions, and in recording these, render unsatisfactory, or even useless, observations that might otherwise be of immense value as data.

The webs of these spiders are composed of two kinds of silk; one yellow, exceedingly viscid, and elastic; the other white, dry, and somewhat brittle. The latter is used in the construction of the framework, guys, and radii, and the former the concentric rings or spirals. The spirals are exceedingly numerous, and as a rule somewhat less than one-third of an inch distant from each other. Between every eight or ten of these circles there is a white thread, which, however, does not form a complete circle, but is looped up and returned in an opposite direction to a corresponding point on the other side of the web. These white lines are put in before the yellow ones are constructed, and doubtless serve to strengthen the huge mesh.

As the result of experiments with the American species, *Nephila plumipes*, Professor Wilder proved\* that these spiders have the power of regulating the thickness of the thread voided, and also that they can produce either yellow or white silk at will, and he even succeeded in drawing off both by artificial means. The Professor wound off silk from the species mentioned for an hour and a quarter, at the rate of six feet per minute, making a total of 450 feet, or 150 yards. This he afterwards removed from the quill for the purpose of ascertaining its weight, and it was found to be one-third of a grain. It was ascertained that it was impossible to reel off more than 300 yards of silk from a spider at one

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\* Proc. Bost. Nat. Hist. Vol. x. p. 200.

time; but this evidently did not exhaust the supply, for on opening the abdomen the glands were found to be still partially filled. Further experiments led this enthusiastic naturalist to believe that *N. plumipes* could be bred in large numbers and utilised for its silk, and for this purpose he suggested that each spider be kept by herself in a wire ring surrounded by water, fed with flies bred for the purpose from old meat, and milked each day of her silk. Every day or two each spider should be taken down, put into a pair of stocks, and milked of its thread until it no longer yielded. By adopting this plan an ounce of silk might be obtained from each spider during the summer. The silk thus reeled off is much smoother and more brightly coloured, as well as finer than that of the silkworm. Several threads would have to be twisted together to obtain one of workable thickness. Although the yellow silk when present in the web is so remarkably viscid and flexible, the same material when drawn off artificially is quite dry and far less elastic.

Now, while it is possible to breed spiders of this or any other genus, and to obtain silk in the manner suggested, the difficulties in the way are far too great for any serious effort in the direction indicated by Wilder, as the space needed for keeping each spider by herself, and the amount of labour necessary to provide them with living food, and to draw off the silk, would render the product too expensive for use.

Spiders of the genus *Nephila*, when in captivity, become quite tame, and soon learn to distinguish their attendant. I have kept numbers of them, and have noticed that, although at first very shy, they quickly learned to take food from the hand, and also water when offered to them on a small camel-hair brush. Exceedingly voracious naturally, they can nevertheless exist for many days without either food or water.

The males of this genus are veritable pigmies in comparison with the females, though in proportion to their size, the legs of the latter are considerably longer; the markings of the male, while similar in many cases to that of the female, are not as distinct, but run together and appear darker.

In autumn these spiders pair. The sexes usually inhabit the same web for a considerable time, the female occupying her customary position in the centre, and the male taking up quarters on the upper edge of the web. Before running down to the female he tries the tension of the web with his feet, after which he proceeds nimbly and lightly, so as not to attract her attention or disturb her in any way, climbs upon her back, and contents himself for a while in moving about in a seemingly objectless manner. During these proceedings she is not all resentful, but apparently disdains all notice. Emboldened by her apparent indifference he endeavours to climb down to the underside of her abdomen, whereupon she immediately shows fight. In an encounter with an adversary of such prodigious proportions in comparison with himself, it is obvious he would be no match; he therefore scrambles off as quickly as possible, and dropping out of the web, remains suspended in the air, or resting upon an adjacent leaf or branch for some time, after which he renews the attack. It not infrequently happens that he has to repeat his efforts several times, and from these he rarely retires scathless, often losing two or three legs. Ultimately, however, he succeeds in attaching himself in the requisite position, and performing the necessary act of fecundation.

Towards the end of April or the beginning of May, the cocoons are constructed. In *Nephila Edwardsii*, the ovisac is about  $\frac{5}{16}$  in. in length, oval, bright golden yellow, and surrounded by an immense quantity of loose silk of a like colour. The cocoons contain from 500 to 1000 eggs. After hatching the spiderlings live together for two or three weeks, spin a web in common, and eat one another or any small insects that may come their way. After this the survivors separate, and each constructs a web on her own account.

The following is a list of the described *Nephilæ* of Australia previous to the publication of the present paper. Those species marked with an asterisk have been described and figured by Koch in Band I. of his admirable work, "Die Arachniden Australiens." Localities outside Australia are in italics :—

- N. venosa*,\* pp. 148-9, T. xii. figs. 1, 1*a*; Brisbane, Port Mackay, and *Ovalau*.  
*N. victorialis*,\* pp. 150-1, T. xii. figs. 3, 3*a*, 3*b*; Rockhampton.  
*N. nigratarsis*,\* pp. 152-3, T. xii. figs. 4, 4*a*, 4*b*; Rockhampton and Port Mackay.  
*N. flagellans*,\* pp. 153-6, T. xii. ♂. figs. 5, 5*a*, 5*b*; ♀. figs. 6, 6*a*; Sydney.  
*N. fuscipes*,\* pp. 156-7, T. xiii. figs. 1, 1*a*; Port Mackay, Rockhampton, Bowen, and *Pelewinsehn*.  
*N. imperatrix*,\* pp. 159-60, T. xii. 3, 3*a*, 3*b*, 3*c*; Rockhampton.  
*N. aurosa*,\* pp. 160-2, T. xiii. fig. 4; Port Mackay.  
*N. procera*,\* pp. 162-3, T. xiv. fig. 1; Port Mackay.  
*N. sulphurosa*,\* pp. 163-5, T. xiv. fig. 2; Port Mackay.  
*N. tenuipes*,\* pp. 165-6, T. xiii. figs. 5, 5*a*; Port Mackay.  
*N. Cunninghamii* (W. S. Macleay), King's "Survey of Australia," Vol. II. pp. 468-9. [Locality not given.]

NOTE.—In Vol. VIII. (Series 2nd), P.L.S.N.S.W., pp. 292-3, Pl. x. figs. 4, 4*a*, 4*b*, 4*c*, 4*d*, 4*e*, 4*f*, under the title of "Descriptions of Some New Araneidæ of New South Wales (No. 3)," I described and figured a new species of *Stephanopsis*, for which I proposed the name *hirsuta*. Since the publication of the paper referred to, I find I have inadvertently used a preoccupied name. I now propose that the species described shall be known as *S. hispida*.

#### EXPLANATION OF PLATES.

##### PLATE XXII.

- Fig. 1. —*Nephila Fletcheri*.  
 Fig. 1*a*.— " " profile of abdomen.  
 Fig. 2. — " *Edicardsii*.  
 Fig. 2*a*.— " " profile of abdomen.

##### PLATE XXIII.

- Fig. 1. —*Nephila ventricosa* ♂.  
 Fig. 1*a*.— " " maxillary palpus ♂.  
 Fig. 2. — " " ♀.  
 Fig. 2*a*.— " " profile of abdomen.